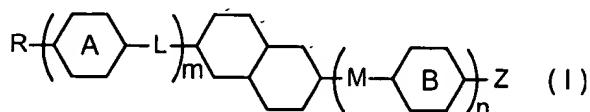


U.S. Patent Application Serial No. 09/763,531  
Amendment dated August 18, 2003  
Reply to OA of April 16, 2003

**IN THE CLAIMS:**

Please amend claims 1, 15, 17 and 21 as follows:

1. (Currently amended) A compound represented by general formula (I) :



(wherein, R and Z may be substituted with a halogen and represent alkyl groups or alkoxy groups having 1-16 carbon atoms, alkenyl groups having 2-16 carbon atoms, alkenyloxy groups having 3-16 carbon atoms, alkyl groups having 1-12 carbon atoms substituted with an alkoxy group having 1-10 carbon atoms, hydrogen atoms, fluorine atoms, chlorine atoms, trifluoromethoxy groups, difluoromethoxy groups, trifluoromethyl groups, 2,2,2-trifluoroethoxy groups, cyano groups, cyanato groups, hydroxy groups or carboxy groups, m and n may be the same or different and respectively and independently represent an integer of 0-2,  $1 \leq m+n \leq 3$ , L and M may be the same or different and respectively and independently represent  $-\text{CH}_2\text{CH}_2-$ ,  $-\text{CH}(\text{CH}_3)\text{CH}_2-$ ,  $-\text{CH}_2\text{CH}(\text{CH}_3)-$ ,  $-\text{CH}_2\text{O}-$ ,  $-\text{OCH}_2-$ ,  $-\text{CF}_2\text{O}-$ ,  $-\text{OCF}_2-$ ,  $-\text{COO}-$ ,  $-\text{OCO}-$ ,  $-\text{CH}=\text{CH}-$ ,  $-\text{CF}=\text{CF}-$ ,  $-\text{C}\equiv\text{C}-$ ,  $-\text{O}(\text{CH}_2)_3-$ ,  $-(\text{CH}_2)_3\text{O}-$ ,  $-(\text{CH}_2)_4-$  or a single bond, rings A and B when present may be the same or different and respectively and independently represent a trans-1,4-cyclohexylene group in which one  $\text{CH}_2$  group or more than one non-adjacent  $\text{CH}_2$  groups in the group may be replaced by  $-\text{O}-$  or  $-\text{S}-$ , a 1,4-phenylene group in which one  $\text{CH}_2$  group or more than one non-adjacent  $\text{CH}_2$  groups in the group may be replaced by  $-\text{N}=$ , a 1,4-cyclohexenylene group, 1,4-bicyclo(2,2,2)octylene group, piperidine-1,4-diyl group, naphthalene-2,6-diyl group, trans-decahydronaphthalene-trans-2,6-diyl group or 1,2,3,4-tetrahydronaphthalene-2,6-diyl group, and although these may be substituted with a cyano group or halogen, in the case m or n represents 2, at least one of the two L or M present represents a single bond; provided that the following cases are excluded:

- i. case in which m and n represent 0, R represents a non-substituted alkyl group, and Z represents a non-substituted alkyl group or cyano group;
- ii. i. case in which either m or n represents 1, the other of m or n represents 0, ring A or ring B when present

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represents a 1,4-cyclohexylene group, L or M when present represents a single bond, R or Z bonded to a decahydronaphthalene ring represents a non-substituted alkyl group, and R or Z bonded to a 1,4-cyclohexylene group represents a non-substituted alkyl group, alkoxy group or alkenyloxy group;

iii. ii. case in which either m or n represents 1, the other m or n represents 0, ring A or ring B when present represents a 1,4-cyclohexylene group, L when present represents -OCO- or M when present represents -COO-, R or Z bonded to a decahydronaphthalene ring represents a non-substituted alkyl group, and R or Z bonded to a 1,4-cyclohexylene group represents a non-substituted alkyl group or cyano group;

iv. iii. case in which either m or n represents 1, the other m or n represents 0, ring A or ring B when present represents a non-substituted 1,4-phenylene group, L when present represents -OCO- or M when present represents -COO-, L or M when present represents a single bond, R or Z bonded to a decahydronaphthalene ring represents an alkyl group, and R or Z bonded to a 1,4-phenylene group represents a non-substituted alkyl group, alkoxy group, hydroxyl group, hydrogen atom, carboxyl group or cyano group;

v. iv. case in which either m or n represents 1, the other m or n represents 0, ring A or ring B when present represent a non-substituted 1,4-phenylene group, L or M when present represents a single bond, R or Z bonded to a decahydronaphthalene ring represents a non-substituted alkoxy group, and R or Z bonded to a 1,4-phenylene group represents a non-substituted alkyl group;

vi. v. case in which either m or n represents 1, the other m or n represents 0, ring A or ring B when present represents a trans-decahydronaphthalene-trans-2,6-diyil group, L when present represents -OCO-, M when present represents -COO- or L or M when present represent a single bond, and R and Z represent non-substituted alkoxy groups;

vii. vi. case in which either m or n represents 1, the other m or n represents 0, ring A or ring B when present represents a non-substituted naphthalene-2,6-diyil group, L when present represents -OCO- or M when present represents -COO-, R or Z bonded to a decahydronaphthalene ring represents a non-substituted alkyl group, and R or Z bonded to a naphthalene-2,6-diyil group represents a non-substituted alkyl group, bromine atom or cyano group, or the case in which R or Z bonded to a decahydronaphthalene ring represents a non-substituted alkoxy group, and R or Z bonded to a naphthalene-2,6-diyil group represents a non-substituted alkyl group or cyano group;

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viii. vii. case in which n represents 2, m represents 0, R represents a non-substituted alkyl group, M when present adjacent to a decahydronaphthalene ring represents -COO-, at least one of rings B present represents a non-substituted 1,4-phenylene group, and Z represents a non-substituted alkyl group or bromine atom, or the case in which at least one of rings B present represents a pyrimidine-2,5-diyI group, and Z represents a non-substituted alkyl group, alkoxy group or cyano group; and

ix. viii. case in which m and n represent 1, ring A represents a trans-decahydronaphthalene-trans-2,6-diyI group or a 1,4-cyclohexylene group, ring B represents a non-substituted 1,4-phenylene group or 1,4-cyclohexylene group, L represents a single bond, M represents -COO-, -OCO-, -CH<sub>2</sub>O- or -OCH<sub>2</sub>-, and R and Z represent non-substituted alkyl groups.

2. (Original): A compound according to claim 1 wherein, ring A and ring B when present respectively and independently represent a 1,4-phenylene group, naphthalene-2,6-diyI group, 1,2,3,4-tetrahydronaphthalene-2,6-diyI group, trans-1,4-cyclohexylene group or decahydronaphthalene-2,6-diyI group that may be substituted with fluorine atom(s).

3. (Original): A compound according to claim 1 wherein, ring A or ring B when present respectively and independently represent a 1,4-phenylene group or trans-1,4-cyclohexylene group that may be substituted with fluorine atom(s).

4. (Original): A compound according to claim 1 wherein, L and M when present represent -CH<sub>2</sub>CH<sub>2</sub>-, -CH<sub>2</sub>O-, -OCH<sub>2</sub>-, -CF<sub>2</sub>O-, -OCF<sub>2</sub>-, -COO-, -OCO-, -CF=CF- or a single bond.

5. (Original): A compound according to claim 1 wherein, L or M represents a single bond.

6. (Original): A compound according to claim 1 wherein, L and M represent single bonds.

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7. (Original): A compound according to claim 1 wherein,  $1 \leq m + n \leq 2$ .

8. (Original): A compound according to claim 1 wherein, R represents an alkyl group, alkoxy group, alkenyl group or alkenyloxy group having 1-12 carbon atoms.

9. (Original): A compound according to claim 1 wherein, Z represents a halogen atom or an alkyl group, alkoxy group, alkenyl group, alkenyloxy group or cyano group having 1-12 carbon atoms.

10. (Previously presented): A compound according to claim 1 wherein, R represents an alkyl group or alkenyl group having 1-12 carbon atoms, m represents 1, n represents 1, ring A represents a trans-1,4-cyclohexylene group, ring B represents a 3-fluoro-1,4-phenylene group or 3,5-difluoro-1,4-phenylene group, L and M represent single bonds, and Z represents a fluorine atom, chlorine atom, trifluoromethoxy group, difluoromethoxy group, trifluoromethyl group, 2,2,2-trifluoroethoxy group or cyano group.

11. (Previously presented): A compound according to claim 1 wherein, R represents an alkyl group or alkenyl group having 1-12 carbon atoms, m represents 0, n represents 1, ring B represents a 3-fluoro-1,4-phenylene group or 3,5-difluoro-1,4-phenylene group, M represents a single bond and Z represents a fluorine atom, chlorine atom, trifluoromethoxy group, difluoromethoxy group, trifluoromethyl group, 2,2,2-trifluoroethoxy group or cyano group.

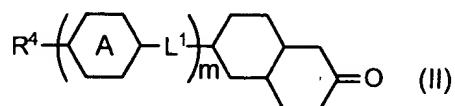
12. (Original): A compound according to claim 1 wherein, R and Z represent alkyl groups or alkenyl groups having 1-12 carbon atoms, m and n represent 1, rings A and B represent 1,4-phenylene groups or trans-1,4-cyclohexylene groups, and L and M represent single bonds.

13. (Original): A compound according to claim 1 wherein, R and Z represent alkyl groups or alkenyl groups having 1-12 carbon atoms, at least one of R or Z represents an alkenyl group, m represents 1, n

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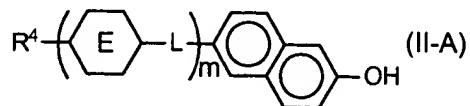
represents 0, rings A and B represent 1,4-phenylene groups or trans-1,4-cyclohexylene groups, and L represents a single bond.

~~X~~ 14. (Previously presented): A compound represented by general formula (II):



(wherein,  $R^4$  represents an alkyl group, alkoxy group, alkenyl group, alkenyloxy group or alkoxyalkyl group,  $L^1$  represents  $-\text{CH}_2\text{CH}_2-$ ,  $-\text{CH}(\text{CH}_3)\text{CH}_2-$ ,  $\text{CH}_2\text{CH}(\text{CH}_3)-$ ,  $-\text{CH}_2\text{O}-$ ,  $-\text{OCH}_2-$ ,  $-\text{CF}_2\text{O}-$ ,  $-\text{OCF}_2-$ ,  $-\text{COO}-$ ,  $-\text{OCO}-$ ,  $-\text{CH}=\text{CH}-$ ,  $-\text{CF}=\text{CF}-$ ,  $-\text{C}\equiv\text{C}-$ ,  $-\text{O}(\text{CH}_2)_3-$ ,  $-(\text{CH}_2)_3\text{O}-$ ,  $-(\text{CH}_2)_4-$ , or a single bond,  $R^4$  represents an alkenyl group, alkenyloxy group or alkoxyalkyl group when  $L^1$  represents a single bond, ring A represents a trans-1,4-cyclohexylene group in which one  $\text{CH}_2$  group or more than one non-adjacent  $\text{CH}_2$  groups in the group may be replaced by  $-\text{O}-$  or  $-\text{S}-$ , a 1,4-phenylene group in which one  $\text{CH}_2$  group or more than one non-adjacent  $\text{CH}_2$  groups in the group may be replaced by  $-\text{N}=$ , a 1,4-cyclohexenylene group, 1,4-bicyclo(2,2,2)octylene group, piperidine-1,4-diyl group, naphthalene-2, 6-diyl group, trans-decahydronaphthalene-trans-2,6-diyl group or 1,2,3,4-tetrahydronaphthalene-2, 6-diyl group,  $m$  represents an integer of 0-2, and the decahydronaphthalene ring has a trans form).

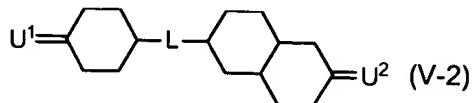
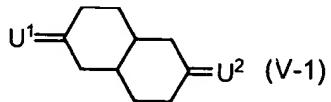
~~X~~ 15. (Currently amended): A production method of general formula (II) according to claim 14 including: reducing a compound represented by general formula (II-A):



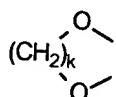
(wherein,  $R^4$  is the same as previously defined in general formula (II), ring E represents a 1,4-phenyl group or trans-1,4-cyclohexylene group,  $L$  is the same as  $L^1$  defined in general formula (II), and  $m$  are is the same as previously defined in general formula (II), and the decahydronaphthalene ring has a trans form), and oxidizing the hydroxyl group as necessary.

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X 16. (Previously presented): A compound represented by general formula (V-1) or general formula (V-2):



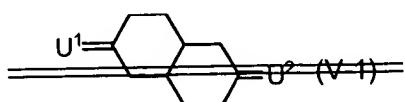
(wherein,  $\text{U}^1$  and  $\text{U}^2$  respectively and independently represent an oxygen atom or the following structure:



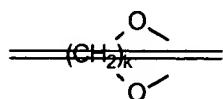
(wherein,  $k$  represents an integer from 1 to 7),  $\text{L}$  represents  $-\text{CH}_2\text{CH}_2-$ ,  $-\text{CH}(\text{CH}_3)\text{CH}_2-$ ,  $-\text{CH}_2\text{CH}(\text{CH}_3)-$ ,  $-\text{CH}_2\text{O}-$ ,  $-\text{OCH}_2-$ ,  $-\text{CF}_2\text{O}-$ ,  $-\text{OCF}_2-$ ,  $-\text{COO}-$ ,  $-\text{OCO}-$ ,  $-\text{CH}=\text{CH}-$ ,  $-\text{CF}=\text{CF}-$ ,  $-\text{C}\equiv\text{C}-$ ,  $-\text{O}(\text{CH}_2)_3-$ ,  $-(\text{CH}_2)_3\text{O}-$ ,  $-(\text{CH}_2)_4-$  or a single bond, and the decahydronaphthalene ring has a trans form).

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O K 17. (Currently amended): A production method of general formula (V-2) or general formula (V-1) according to claim 16, or general formula (V-1):



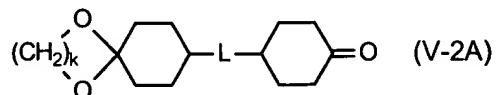
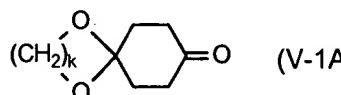
(wherein,  $\text{U}^1$  and  $\text{U}^2$  respectively and independently represent an oxygen atom or the following structure:



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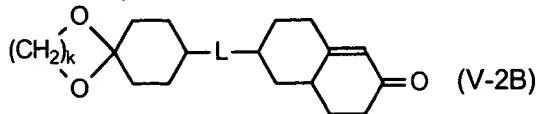
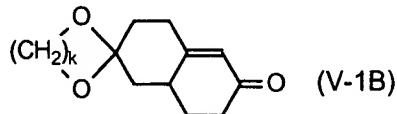
(wherein, k represents an integer from 1 to 7), L is the same as previously defined in general formula (f), and the decahydronaphthalene ring has a trans form)

the method including: converting a compound represented by general formula (V-1A) or general formula (V-2A):



C,  
cont.

(wherein, k and L are the same as previously defined in claim 16 general formula (V-2), and L is the same as previously defined in general formula (f)) into an enamine using a secondary amine, and reacting it with methyl vinyl ketone to obtain a compound represented by general formula (V-1B) or general formula (V-2B)

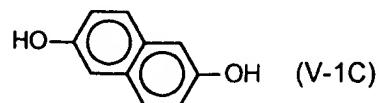


(wherein, k and L are the same as previously defined in claim 16 general formula (V-2), and L is the same as previously defined in general formula (f)) followed by reductive hydrogenation.

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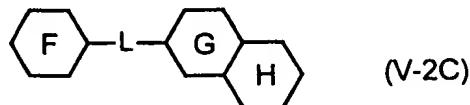
X 18. (Previously presented): A production method of general formula (V-1) according to claim 17

including: reducing a compound represented by formula (V-1C) by hydrogen in the presence of metal catalyst:

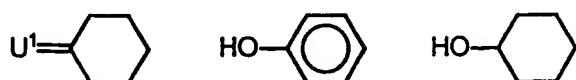


oxidizing the hydroxyl groups as necessary, and protecting the carbonyl groups as necessary.

OK 19. (Original): A production method of general formula (V-2) according to claim 16 including:  
reducing a compound represented by general formula (V-2C):



C<sub>1</sub> cont.  
(wherein, although ring G represents a cyclohexane ring or benzene ring, a single bond(s) of the cyclohexane ring may be replaced by double bond(s), and although rings F and H respectively and independently represent the following structures:

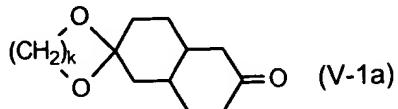


(wherein, U<sup>1</sup> is the same as previously defined in general formula (V-1) or general formula (V-2)), a single bond(s) of the cyclohexane ring may be replaced by double bond(s)), oxidizing the hydroxyl group as necessary, and further protecting the carbonyl group as necessary.

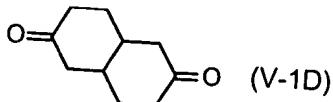
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20. (Previously presented): A production method of general formula (V-1a):

OK



(wherein k represents an integer from 1 to 7) including monoacetalation of a compound represented by general formula (V-1D):



X 21. (Currently amended): A liquid crystal composition containing a compound according to any of claims claim 1 through 13.

C<sub>1</sub>  
cont.

X 22. (Previously presented): A liquid crystal device having for its constituent feature the liquid crystal composition according to claim 21.

103 X 23. (Previously presented): An active matrix drive, liquid crystal device that uses the liquid crystal composition according to claim 21.

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24. (Previously presented): A super twisted nematic liquid crystal device that uses the liquid crystal composition according to claim 21.